

1 semiconductor die. Fig. 4D of Wen, to which the Examiner has specifically  
2 referred, shows parallel word lines 43a and 43b. Note, however, that neither Fig.  
3 4D nor any other of Wen's figures show any actual contacts for connection to  
4 external components. In fact, the reference specifically notes at col. 7, lines 21-25,  
5 that certain steps, including formation of contacts, are not specifically described in  
6 the patent document. Thus, the Wen reference contains no teachings related to the  
7 location of contacts on a semiconductor die. The Examiner has conceded in the  
8 Office Action that Wen does not disclose "electrical contacts at opposite edges of  
9 the substrate configured to allow communications through the channels via the  
10 electrical contacts, and connecting portions at both ends of the module." Office  
11 Action, page 2, lines 21-24.

12 Mettler describes electrical contacts connected at an end of a substrate by a  
13 connector. Fig. 7 of Mettler, to which the Examiner refers, shows a single  
14 connector 52 at one edge of the substrate. Electrical leads (contacts) 22 that make  
15 up a set of leads (contacts) 48 extend from IC 26 to the single connector 52. A  
16 second set of leads (contacts) 54 from the IC 26 is wrapped around the substrate  
17 and is connected the single connector 52 (see col. 6, lines 9-12 of Mettler). The  
18 intent behind Mettler is to provide a single common connector located on a single  
19 edge that accesses the leads (channels) to the IC. Therefore, providing *electrical*  
20 *contacts at opposite edges* is not suggested by Mettler, and in fact goes against the  
21 teachings found in Mettler.

22 Tamarkin describes memory devices with contacts at opposite ends, but  
23 does not show a channel that passes through the memory devices. Fig. 2 of  
24 Tamarkin, to which the Examiner refers, shows a set of various random access  
25 memory (RAM) modules 24 connected to connectors 18, 20. Note, however, that

1 neither Fig. 2 nor any other of Tamarkin's figures show any channels that connect  
2 the modules on the substrate and allow communications between the modules.

3  
4 **§ 103 Rejections**

5 Claims 1-8, 11-21, and 23-28 have been rejected as being anticipated by  
6 Wen in view of Mettler and Tamarkin.

7 **Claim 1** recites in part:

8 a plurality of memory devices disposed on the substrate;

9 a plurality of channels extending between the opposite edges,  
10 wherein each of the plurality of memory devices is coupled to  
one of the plurality of channels; and

11 electrical contacts at the opposite edges of the substrate configured  
12 to allow communications through the channels via the  
electrical contacts.

13  
14 As discussed above, Wen does not disclose "electrical contacts at opposite  
15 edges of the substrate configured to allow communications through the channels  
16 via the electrical contacts, and connecting portions at both ends of the module."

17 As stated in the Office Action, Mettler teaches the use of a connector at  
18 "an" end of a substrate—at a single end of the substrate. Mettler, in fact, takes  
19 great pains to make sure that the connections are all at one end of the substrate,  
20 showing various techniques for wrapping conductors around the substrate for use  
21 with a single connector. Thus, Mettler *teaches away* from the recited elements of  
22 claim 1, which include "electrical contacts at the opposite edges of the substrate."  
23 The law is clear that any reference that teaches away from a claimed feature in this  
24 manner cannot be used in a combination purported to show the obviousness of the  
25 claimed feature:

1 Numerous decisions recognize that an invention that otherwise  
2 might be viewed as an obvious modification of the prior art will not  
3 be deemed obvious in a patent law sense when one or more prior art  
4 references "teach away" from the invention. E.g. *Gillette Co. v. S.C.*  
*Johnson & Sons, Inc.*, 919 F.2d 720, 724, 16 USPQ2d 1923, 1927  
(Fed. Cir. 1990) (the closest prior art reference "would likely  
discourage the art worker from attempting the substitution suggested  
by [the inventor/patentee].)

5 Chisum on Patents, Vol 2, chapter 5, §5.03, G. Thus, because Mettler explicitly  
6 teaches the need for all contacts to be at a single edge of a substrate, this reference  
7 highlights the *non-obviousness* of claim 1, which recites "electrical contacts at the  
8 opposite edges of the substrate." Mettler cannot fairly be said to establish the  
9 obviousness of electrical contacts at opposite edges of a substrate.

10 In addition to reciting contacts at opposite edges of a substrate, claim 1  
11 recites a plurality of channels extending between the edges, wherein the electrical  
12 contacts at the opposite edges "allow communications through the channels via the  
13 electrical contacts." The Office Action does not establish any suggestions for such  
14 an element. As discussed above and conceded by the Examiner, Wen does not  
15 show electrical contacts, and Mettler shows an electrical connector only at one  
16 edge.

17 The Office Action recognizes these shortcomings of Wen and Mettler,  
18 citing Tamarkin for its disclosure of connectors at opposite ends of a substrate.  
19 However, there is nothing in Tamarkin to suggest the use of such connectors in  
20 conjunction with a structure having "channels extending between the opposite  
21 edges," wherein electrical contacts at opposite edges "allow communications  
22 through the channels via the electrical contacts," as recited by claim 1. There is no  
23 obvious combination of the three cited references which would satisfy these claim  
24 elements.  
25

1 Specifically, there is nothing in any of the references that would have  
2 suggested utilizing connectors at each end of Wen's channels. The Examiner  
3 asserts that this would have been suggested by Tamarkin. However, Tamarkin's  
4 connectors are not used at either end of a channel. Furthermore, the cited art fails  
5 to recognize any advantages or even any utility in using connectors at opposite  
6 ends of channels. In this regard, Wen does not even discuss connectors, while  
7 Tamarkin fails to utilize connectors that allow communications *through* such  
8 channels. The advantages of the claimed structure are apparent only in light of the  
9 Applicant's disclosure. Absent any recognition in the prior art of such advantages,  
10 it cannot be said that it would have been obvious to modify the references to result  
11 in the claimed structure.

12 The law is clear that any combination of references must be supported by a  
13 suggestion, in the references themselves, of the desirability of the combination:

14 To establish a prima facie case of obviousness, three basic  
15 criteria must be met. First, there must be some suggestion or  
16 motivation, either in the references themselves or in the knowledge  
17 generally available to one of ordinary skill in the art, to modify the  
18 reference or to combine reference teachings. Second, there must be  
19 a reasonable expectation of success. Finally, the prior art reference  
(or references when combined) must teach or suggest all the claim  
20 limitations. *The teaching or suggestion to make the claimed  
21 combination and the reasonable expectation of success must both be  
22 found in the prior art, and not based on applicant's disclosure."*

23 MPEP, section 2142, 2100-108 (Rev. 3) (emphasis supplied).

24 In this case, the prior art discloses no advantages or utility for the proposed  
25 combination. Accordingly, the combination proposed by the Examiner would not  
have been obvious, and the rejection of claim 1 is unfounded. Allowance of claim  
1 is respectfully requested.

1       **Claims 2, 3, 4, 5 and 6** depend on claim 1 and are allowable both for their  
2 additional recited elements and because of their dependence from an allowable  
3 base claim.

4       **Claim 7** recites:

5       a first substrate having a plurality of memory devices disposed  
6       thereon and a first channel portion extending across the first  
7       substrate, the first substrate having opposite ends and contacts  
8       at the opposite ends to allow communications through the  
9       first channel portion via the contacts at the opposite ends of  
10       the first substrate.

11       As discussed above and conceded by the Examiner, Wen does not show  
12 electrical contacts, and Mettler shows an electrical connector only at one edge,  
13 while Tamarkin fails to suggest connectors that allow communications through  
14 channels.

15       Claim 7 further in part recites:

16       a second substrate having a plurality of memory devices disposed  
17       thereon and a second channel portion extending across the  
18       second substrate, the second substrate having opposite ends  
19       and contacts at the opposite ends to allow communications  
20       through the second channel portion via the contacts at the  
21       opposite ends of the second substrate; and

22       a first connector configured to communicatively couple the first  
23       channel portion to the second channel portion through at least  
24       some of the contacts of the first and second substrates,  
25       wherein the first connector engages contacts at a first of the  
26       ends of the first substrate and engages contacts at a first of the  
27       ends of the second substrate.

28       First and second substrates with first and second channels are described in  
29 the flowchart of Fig. 6 and on page 13, lines 5-10 of the specification. This is  
30 further illustrated in Fig. 7 as substrates 502, 506, and 510, and described on page  
31 14, lines 2-3 of the specification. The cited references do not suggest a second

1 substrate, a second channel and a connector to couple the first and second  
2 channels. Tamarkin shows stacked circuit assemblies (substrates) and a connector  
3 connecting the assemblies; however, Tamarkin fails to suggest the use of  
4 communication channels, or, specifically, the use of a connector to couple first and  
5 second channel portions as recited by claim 7. Wen and Mettler similarly fail to  
6 suggest such a connection. Furthermore, the Office Action fails to acknowledge  
7 this recited element of claim 7, and does not point to anything in the references  
8 that would have suggested a first connector as recited in claim 7. Accordingly, the  
9 rejection of claim 7 is unsupported by the prior art, and should be withdrawn.

10 **Claims 8, 11, 12, 13, 14, 15, 16, 17, 18, and 19** depend on claim 7 and are  
11 allowable both for their additional recited elements and because of their  
12 dependence from an allowable base claim.

13 **Claim 21** recites:

14 a first memory module having contacts at opposite ends thereof, a  
15 first channel portion extending across the first memory  
module between the contacts;

16 a second memory module having contacts at opposite ends thereof, a  
17 second channel portion extending across the second memory  
module between the contacts;

18 a first connector coupling the first memory module to the second  
19 memory module through contacts at first ends of the first and  
second memory modules; and

20 a second connector that engages contacts at the second ends of the  
21 first and second memory modules.

22 As discussed above, there is no obvious combination of the references that  
23 would have suggested the recited structure and interaction between components.

24 Allowance of claim 21 is respectfully requested  
25

1       **Claim 23** depends on claim 21 and is allowable both for its additional  
2 recited elements and because of its dependence from an allowable base claim.

3       **Claim 24** is allowable for reasons similar to those presented above.  
4 Accordingly, it is respectfully requested that claim 24 be allowed. Claim 24  
5 recites:

6             arranging channel portions on a substrate such that the channel  
7             portions extend between opposite edges of the substrate;

8             arranging contacts at the opposite edges of the substrate to allow  
9             communication through the channel portions;

10            arranging channel portion conductors such that the length of the  
11            channel portion conductors between opposite edges of the  
12            substrate is approximately equal; and

13            coupling together a pair of such substrates using a connector, a  
14            channel extending across the pair of substrates and the  
15            connector

16        Although Tamarkin shows stacked circuit assemblies (substrates) and a  
17        common connector connecting the assemblies; Tamarkin fails to suggest the use of  
18        communication channels. Furthermore, the Office Action does not indicate any  
19        suggestion in the prior art of “coupling” a pair of substrates in this manner. Thus,  
20        allowance of claim 24 is respectfully requested

21        **Claims 25, 26, 27, 28, 29, and 30** depend on claim 24 and are allowable  
22        both for their additional recited elements and because of their dependence from an  
23        allowable base claim.

24        **Claim 31** is allowable for reasons similar to those presented above.  
25        Accordingly, it is respectfully requested that claim 1 be allowed. Claim 31 recites:

          one or more board connectors that engage the contacts at the first  
          ends of the first and second memory modules to allow  
          communications through the one or more communication  
          channel portions of the memory modules.

1 As discussed above, none of the cited references suggest such a feature.  
2 Allowance of claim 31 is respectfully requested.

3 **Claims 32 and 33** depend on claim 31 and are allowable both for their  
4 additional recited elements and because of their dependence from an allowable  
5 base claim.

6 **Claim 34** is allowable based on the arguments presented above.  
7 Accordingly, it is respectfully requested that claim 31 be allowed. Claim 34  
8 recites:

9 a substrate having opposite ends and at least one surface;  
10 contacts at the opposite ends of the substrate;  
11 one or more memory devices mounted to the surface of the substrate;  
12 and  
13 one or more communication channel portions extending across the  
14 module between the contacts, the one or more communication  
channel portions being configured to allow communications  
through the contacts with the one or more memory devices.

15 As discussed above, the references do not suggest communication channel  
16 portions extending between contacts such as recited in claim 34. Allowance of  
17 claim 34 is therefore respectfully requested.

18 **Claims 35, 36, 37, and 38** depend on claim 34 and are allowable both for  
19 their additional recited elements and because of their dependence from an  
20 allowable base claim.  
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1  
2 **Conclusion**

3 It is respectfully submitted that all claims are in a condition for allowance,  
4 and action to that end is requested. The Examiner is requested to telephone the  
5 undersigned if that would be helpful in expediting allowance.  
6

7 Respectfully Submitted,

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9 Dated: 10/17/02

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